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Foreign Direct Investment and Integration into Global Production and Distribution Networks

The Case of Poland

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Beata K. Smarzynska

Integration into the production and marketing arrangements of multinational corporations may offer many benefits to transition economies that, after a long period of isolation, have liberalized trade and investment. The fragmentation of production offers a unique opportunity for producers in developing countries to move from servicing small local markets to supplying large firms abroad and, indirectly, their customers all over the world.

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Summary findings

Not until the end of the twentieth century, the "second globalization," has the ratio of trade to GDP been comparable to that during the first globalization, which took place at the end of the nineteenth century and was interrupted by World War I. Technological progress has increased the importance of the international division of labor and of global production and distribution networks. Multinational corporations have been a driving force behind these developments. As a transition economy, Poland provides an interesting case for study, as its sudden opening to foreign investment after a long period of isolation allows the process of integration into global networks to be studied more clearly.

Using Poland as a case study, Kaminski and Smarzynska study multinational corporations' role in integrating a host country into the increasingly international division of labor. They provide evidence that inflows of foreign direct investment are increasing Poland's participation in global production and distribution networks. They conclude that because of the large volume of foreign direct investment inflows expected in Poland in the near future, Poland's exports—driven by fragmented production—will continue to expand at even faster rates than observed there recently.

This paper—a product of Trade, Development Research Group—is part of a larger effort in the group to study the effects of foreign direct investment on economic activity. Copies of the paper are available free from the World Bank, 1818 H Street NW, Washington, DC 20433. Please contact Lili Tabada, room MC3-333, telephone 202-473-6896, fax 202-522-1159, email address ltabada@worldbank.org. Policy Research Working Papers are also posted on the Web at http://econ.worldbank.org. The authors may be contacted at bkaminski@gvpt.umd.edu or bsmarzynska@worldbank.org. July 2001. (27 pages)

Foreign Direct Investment and Integration into Global Production and Distribution Networks: The Case of Poland[x/]

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I. Introduction

Fragmentation of production combined with the creation of distribution networks spanning across continents characterizes the second globalization that has gained momentum in recent years.[1] Information revolution and new technologies have made it possible to divide the industry's value chain into smaller functions that can be contracted out to independent suppliers.[2] This fragmentation of production offers a unique opportunity for producers in less developed countries to move from servicing small local markets to supplying large firms abroad and indirectly their customers all over the world. This phenomenon is accompanied by an evolution in the nature of competition with its growing emphasis on customization of products, rapid innovation, flexibility and fast response to changes in demand. In many cases, managerial and technological skills required to successfully compete in global markets make it impossible to rely on the resources of one country. Under these circumstances, integration into the production and marketing arrangements of the multinational corporations (MNCs) rather than the pursuit of an autarchic national development strategy has become the most efficient way of taking advantage of growth opportunities offered by the global economy.

While the economic literature has carefully studied potential benefits brought by inflows of foreign direct investment (FDI) such as technology transfer and spillovers,[3] little attention has been paid to other advantages arising from the presence of multinationals. This paper aims to fill a gap in the existing literature by examining the positive effect of FDI created through the integration of a host country into the global economy and the system of international division of labor based on fragmentation of production.

This study focuses on the case of Poland and the potential benefits it can reap from becoming part of global production and distribution networks. Studying this question in the context of a transition economy is particularly interesting, since its sudden opening to foreign investment after a long period of isolation allows us to observe the process of integration into global networks more clearly. From an economist's perspective, this unique opportunity is the next best thing to a natural experiment.

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[1] The first globalization took place at the end of the 19th century and was ended by World War I and the Great Depression. It was not until the end of the 20th century that most countries achieved the ratio of trade to GDP comparable to that prevailing during the first globalization (see Feenstra 1998).

[2] See Borrus and Zysman (1997).

[3] See, for instance, Haddad and Harrison (1993), Blomström and Wolff (1994), Aitken and Harrison (1999).

The study reviews briefly the developments in Poland's foreign trade and FDI inflows that took place over the recent years. Poland's foreign trade in goods has recorded uninterrupted growth since 1989 especially strong on the side of imports. Its geographic orientation shifted from the former Council for Mutual Economic Assistance (CMEA) countries towards the European Union. The composition of exports changed significantly with skilled labor intensive products growing in importance. Poland has also attracted relatively large inflows of FDI, especially in the second half of the 1990s. Over the last decade, the composition of FDI inflows has shifted from advertising-intensive joint ventures towards R&D-intensive wholly owned projects.

Foreign owned firms have already had a significant impact on Poland's international trade. Our findings indicate that foreign owned firms tend to be more export-oriented than local companies and that they tend to operate in industries that are more capital and skilled labor intensive. Foreign owned firms are often active in sectors with large export potential (i.e., so called 'sunrise sectors'). The data also suggests that thanks to the activities of MNCs Poland is becoming part of the rapidly growing global production and distribution networks. The study concludes that the large volume of FDI inflows will contribute to an expansion of Polish exports which will be driven by production fragmentation and participation in the global division of labor.

This paper is structured as follows. In the next section, we present a brief overview of methodological issues involved in assessing the role of foreign-owned firms in international trade. Section 3 discusses changes in FDI inflows in terms of their value, ownership and other characteristics. Section 4 identifies changes in Poland's trade patterns during transition, whereas Section 5 links these changes to foreign owned firms. Section 6 focuses on production and distribution networks as revealed in Poland's trade with the EU and presents case studies of three foreign companies active in Poland. The concluding section closes the paper.

II. Methodological Issues: problems of measuring intra-product trade

The possibility of 'dividing up the value chain' of production allows for internationalization of the manufacturing process on unprecedented scale with deep implications for the global division of labor. The result of these developments is—to borrow an apt phrase from Feenstra (1998)—integration of trade and disintegration of production in the global economy. MNCs are instrumental in setting up supply chains cutting across many national borders. Complex specialization implicit in intra-industry trade extends the division of labor to

parts and components of products within larger transborder supply chains and leads to intra-product trade (Arendt and Kierzkowski 2000).

Production fragmentation occurs across national borders thus triggering extra foreign trade flows. A significant portion of these flows is intra-firm trade, i.e., transactions taking place among subsidiaries of MNCs. Fragmentation of production may also manifest itself through outsourcing, which does not involve acquiring property rights over a supplier by a contracting firm. Without access to firm data, which are usually not disclosed, precise assessment of this intra-product trade is very difficult.

There have been a few attempts to assess empirically the scope of foreign trade that can be directly attributed to production fragmentation. Some studies use intra-industry trade (IIT)—as measured by the well-known Grubel-Lloyd index[4]— to estimate the growth of trade due to fragmentation (Kierzkowski 2000). While the IIT clearly includes fragmentation-related trade, it also captures a large portion of trade that may have little to do with production sharing or fragmentation.[5] Undoubtedly, fragmentation-driven intra-product trade accounts for some portion of ITT. The empirically observed positive correlation between multinational activity and IIT (Markusen and Venables 1998) would clearly point in this direction. But it would be difficult to estimate the share of this trade in IIT. The distinction between horizontal and vertical intra-industry trade—the latter involves exchange of similar goods of different quality, whereas the former comprises exchange of similar goods that are not differentiated in terms of quality—does little to solve the problem. Products subject to mutual exchanges often enter different market niches, although in some cases lower quality products may be imported for processing.[6]

Other authors suggest employing the 'end-use' categories of the US Bureau of Economic Analysis, which allow to identify products in terms of their use by buyers rather than by their positions in production process (Feenstra 1998; Irwin 1996). This typology identifies the following five categories: foods, feeds and beverages; industrial supplies and materials; capital

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[4] The GL index of intra-industry trade between two partners is usually expressed as: $GL = 1 - \sum[| Xi - Mi | / \sum (Xi + Mi)]$, where X represents exports of a country to its partner and M imports from the partner of product *i*. The index suffers from two problems: aggregation and aggregate trade imbalances.

[5] Technological factors may lower the minimum efficient scale of production and thus allow the market support more firms and greater variety (Hufbauer, 1970). Furthermore, consumer preferences rather than globalization of production shape trade in, for instance, motor vehicles between the EU and the United States. This trade allows realization of economies of scale thanks to greater product specialization in differentiated products.

[6] For instance, Aturupane, Djankov, and Hoekman (1997) find that vertical intra-industry trade accounted for 80-90 percent of total IIT of CEEC with the EU. It would be impossible to estimate what proportion was further processed in the EU.

goods (excluding autos); consumer goods (except autos); and automotive vehicles and parts.[7] While this typology makes it possible to assess changes in exports and imports in terms of increased or decreased processing, it does not give any more direct information on trade due to production fragmentation. The fall in the combined share of foods, feeds and beverages, industrial supplies and materials merely indicates that processed goods play a growing role in country's trade. But it remains unclear which portion of this trade can be directly attributable to the shift in stages of production (or value chains) across borders.

Yeats (1998) has brought to attention a more direct way of estimating this trade. He pointed out that data required estimating trade in parts have been available in foreign trade statistics based on SITC (Standard International Trade Classification) Revision 2 for the last two decades. The most complete coverage is within machinery and transport equipment (SITC 7), which distinguishes among around 60 individual three-, four-, and five-digit product groups consisting solely of other manufactured equipment. But there is one major problem with this approach—it dramatically underestimates the share of intra-product trade. In fact, the SITC does not do a good job in distinguishing between assembled goods and parts. Although, for instance, a piston engine is not identified as 'a part' in the SITC system, it may be clearly a part of an automobile. Similarly, the SITC system identifies parts of TV tubes and electronic microcircuits. But TV tubes, electronic microcircuits, etc. themselves may also be parts assembled in other products. The line is fuzzy but in some cases its identification is relatively straightforward.

Kaminski and Ng (2001) suggest expanding analysis to parts identified in other sections of SITC as well as to components and final products in four sectors of manufacturing: office equipment; telecommunication equipment; motor vehicles and furniture. The latter has been included to account for very important role that furniture plays in trade of Central European transition economies. The first two sectors—office equipment and telecommunication equipment—represent production associated with information revolution. The empirical evidence suggests that MNCs dominate these two sectors as well as motor vehicles. Suppliers in these sectors tend to be either subsidiaries of MNCs or operate in outsourcing within MNC networks of manufacturing and distribution. Anecdotal evidence also suggests that furniture producers tend to be integrated into larger retailers. Kaminski and Ng refer to the production arrangements in these sectors as production and marketing networks.

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[7] The industrial supplies and materials include mainly raw materials but also some basic manufactured goods such as steel, newsprint, textile yarns, etc. The capital goods are used for both investment and as intermediate products (all electrical parts and components except finished consumer goods are regarded as capital goods). The consumer goods are finished household products.

In order to establish the link between networks and FDI, we shall use the data on exports of foreign owned firms by sector since some sectors can be easily related to respective networks. Furthermore, we shall discuss two case studies that offer additional insights into developments within automotive and telecommunications networks and one case study going beyond the network analysis. The latter example provides evidence that participation in global networks of production and marketing often involves horizontal rather than vertical FDI, whereas the automotive case suggests that a firm may serve several MNCs rather than a single one.

III. Shifts in Foreign Direct Investment: from "advertising-intensive" joint ventures to "R&D-intensive" wholly owned projects

Theoretical studies of FDI emphasize the importance of the so called *ownership advantages* and suggest that firms undertaking FDI are endowed with greater intangible assets than domestic firms. Numerous empirical studies have confirmed this by showing thatMNCs are usually more technology-intensive and advertising-intensive than firms that do not engage in FDI (see Dunning 1993 and Markusen 1995 for discussions of this point). These findings, however, have not been confirmed in the context of transition economies. The empirical analysis performed by Meyer (1998) shows that technology-intensity is not a determinant of a firm's probability to invest in the region. Furthermore, Smarzynska (1999) finds that foreign firms with low, rather than high, R&D-intensity were more likely to undertake FDI in transition economies in the early 1990s. At the same time firms undertaking FDI in the region were found to be highly advertising-intensive. Thus, while Poland was not attracting high technology investors in the early 1990s, it was definitely benefiting from an inflow of marketing skills.

Indeed, during the initial stages of transition, there were two notable factors attracting FDI to Poland. First, there was unsatisfied demand for consumer goods and services, a legacy of central planning which was strongly biased against services and consumer products. The collapse of the CMEA and downturn of many Polish industries created a great opportunity for new products coming from the West. FDI aiming at meeting pent-up local demand for consumer goods was prevalent. In manufacturing, foreign investors have focused primarily on food, beverage (especially beer and soft drinks), tobacco, cosmetics and publishing industries. Large investors such as Coca Cola Amatil, Pepsico, United Biscuits, Philip Morris, Unilever and Nestle have entered the market in response to excess demand. The underdevelopment of the Polish service sector also represented a huge market opportunity for foreign investors, and a large number of foreign enterprises have been attracted into the trade, retail and consumer services.

The second pull factor was tariff jumping. Admittedly, it was much less powerful than the first one and short-lived, as the European Agreement signed with the EU has imposed significant restraints on changes in tariff rates. In 1992, FDI-intensive industries had average import tariffs about 66 percent higher than manufacturing as a whole (EBRD 1994). The main "delinquent" was the automobile industry. Seeking to attract an investment by the General Motors, Poland raised tariffs on imported new cars from 15 to 35 percent in 1991. Although the talks with the General Motors eventually broke up, tariff rates remained in place as other investors (Fiat and Daewoo) stepped in to take advantage of a rapidly expanding and highly protected market.

Another trend observed in Poland, and also in other transition economies as they liberalized their respective economic regimes, was a gradual shift from joint ventures to wholly-owned investments. Companies with 100 percent foreign ownership accounted for 40 percent of FDI projects in Poland in 1993, 45 percent in 1995 and 50 percent in 1998.[8] As Smarzynska (2000) shows, wholly-owned projects are likely to be undertaken by foreign investors possessing cutting edge technologies and superior marketing skills. Foreign investors with these characteristics, however, tend to shy away from joint ventures. In consequence, as the composition of FDI inflows shifts from partial to full ownership, Poland is likely to benefit more from inflow of sophisticated technologies and superior marketing skills.

FDI carried out in a distortion-free policy environment yields several benefits to an economy in transition.[9] Foreign investment is a powerful vehicle for transfers of technology, best management practices and for integrating domestic production capacities into global networks of production and distribution. As recent research shows, firms with foreign equity participation are more likely to export than firms with purely domestic capital. Similarly, the probability that a firm commences exporting is two and a half times higher for firms with foreign equity participation that for firms without foreign capital (Kraay et al. 2000). Becoming part of a production and distribution network of an MNC offers a 'cheap way' of marketing products. Firms do not incur marketing cost, which are usually quite significant for newcomers (Roberts and Tybout 1998). The experience of Hungary shows the importance of FDI in industrial

[8] Source Foreign Trade Research Institute (1998 and 1999) and Main Statistical Office (1999).

[9] Poland's policy towards the automotive sector is an example of a distortion creating policy. Very high rates of effective protection provided strong incentives for assembling vehicles at the expense of production of parts and components.

realignment and contribution to competitiveness in international markets.[10] Furthermore, FDI allows firms to realize economies of scale and leads to the growth of intra-industry trade. The advantage of this trade vis-à-vis inter-industry trade is that it is less vulnerable to swings in domestic business cycle and it does not produce such significant inequalities in regional development and income distribution.[11]

Despite its internationally praised stabilization-*cum*-transformation program launched in 1990 and opening to foreign investment, Poland did not attract significant FDI inflows until 1995 following its agreement with the London Club. In 1995, the value of FDI inflows into Poland surged to US$3.6 billion (net of repatriation), which amounted to around 80 percent of the aggregate value of FDI inflows over 1990-94 and was double of the value in 1994 (Table 1). Measured against the GDP, the volume of FDI was equal on average to around three percent over 1995-97 and five percent in 1998-99.[12] These inflows put Poland in 2000 on a par with Hungary around 1995, since in 1991-94 Hungary received FDI inflows equivalent to five percent of the GDP.[13]

Table 1: Foreign Direct Investment in Poland, 1990-99

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	TOTAL, 1990-96	TOTAL, 1997-99	TOTAL, 1990-99
FDI inflows (million of US dollars)	89	291	678	1,715	1,875	3,659	4,498	3,041	6,164	6,180	12,805	15,385	28,190
FDI inflows per capita (US dollars)	2	8	18	44	49	95	117	79	160	160	332	399	730

Source: *Global Development Finance*, The World Bank, Washington, D.C., various issues, and *Survey of Europe*, United Nations Economic Commission for Europe, New York and Geneva, various issues.

As a relatively short time has elapsed since FDI began flowing on a larger scale into Poland, its full impact is yet to be felt. As can be seen from data in Table 1, about 43 percent of the value of total FDI inflows over 1990-99 came in 1998 and 1999. Poland accounted then for almost half of total flows to Central and Eastern European countries (CEEC-10[14]). Given the size of the FDI inflows one suspects that their impact on the Polish economy will be quite substantial.

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[10] For a detailed analysis of FDI impact on Hungary's competitiveness in EU markets, see Kaminski (2000). For an empirical examination of multiple impacts of FDI on transformation of the Hungarian economy see Kaminski and Riboud (2000).

[11] For a thorough discussion, see Krugman, (1994, pp. 38-51).

[12] Source: IMF *International Financial Statistics* (Balance of Payment data).

[13] Interestingly, the level of penetration of foreign-owned firms in Hungary around 1994-95 is similar to that in Poland in 1998-99.

[14] CEEC-10 include the ten 'EU associates'—Bulgaria, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovak Republic, and Slovenia.

Taking into account lead times involved in construction and restructuring, the full impact of FDI on the economy is yet to materialize, although it has already been significant. Consider first foreign firms' rapidly expanding role in industrial restructuring. The share of foreign firms in total investment outlays increased from 20 percent in 1994 to 33 percent in 1996 and 40 percent in 1997. In manufacturing, this share is significantly higher and amounted to 56 percent of the total in 1997.

Considering already high levels of FDI penetration in industry and services, an interesting question is how FDI has affected Poland's foreign trade. The next three sections seek to provide an answer to this question by first delineating features of foreign trade in the 1990s and then assessing the extent to which FDI has been responsible for them.

IV. Salient Features of Poland's Trade during Transition

Four features of Poland's trade stand out. First, foreign trade turnover has expanded continuously since the implementation of stabilization cum transformation program in 1990. Second, its composition has undergone enormous change indicating successful effort in industrial restructuring. Third, the factor content of Poland's exports to the EU has shifted towards skilled labor intensive and capital intensive products. Fourth, Polish exporters seem to have been breaking away from "sunset" markets, as they specialize increasingly in products for which EU import demand has been growing.

An important feature of development in Poland's foreign trade in the 1990s was a much faster expansion in imports than in exports. The former grew on average 27 percent annually and the latter expanded at 10 percent per annum. The value of exports doubled from US$15 billion in 1990 to US$30 billion in 1998, whereas the value of imports grew six times from US$8 billion to US$48 billion. During the past decade the European Union became the most important trading partner of Poland. The share of Polish exports directed to the EU increased from 47 percent in 1990 to 68 percent in 1998. The corresponding increase in imports was from 51 to 66 percent.

Since 1991 Poland has had a trade deficit. The ratio of export earnings to import expenditures has grown each year reaching 60 percent in 1998 down from 80 percent in 1994-95. Continuous increase in the size of the trade deficit has been a major concern for policy makers. The trade deficit was exacerbated by the Russian crisis that led to a 68 percent drop in Poland's exports to Russia during the first nine months of 1999 as well as by the slowdown in Polish exports to the EU.[15] The latter increased only by 2.2 percent in 1999 which was less than the 3

[15] Authors' calculations based on figures from IMF's *Direction of Trade Statistics.*

percent increase in EU external imports. While Poland maintained its relative position vis-à-vis other Central and Eastern European countries in terms of share in CEEC-10's EU-oriented exports, its performance was dwarfed by that of Hungary and the Czech Republic.

The second important feature of Poland's trade during transition was a very significant shift in its composition towards manufactured goods indicating a rapidly unfolding process of industrial restructuring (Kaminski 1998). On the export side, the share of food, feeds and beverages fell from 20 percent in 1989 to 10 percent in 1993 and 7 percent in 1998. The share of industrial supplies materials also declined from 32 percent to 22 percent and 14 percent over the same period, while the combined share of capital goods and automotive vehicles and parts increased from 11 percent in 1989 to 17 percent in 1993 and 27 percent in 1998.

Similar shifts were seen on the import side with the share of foods, feeds and beverages falling from 17 percent in 1989 to 10 percent in 1993 and 6 percent in 1998. While the share of industrial supplies and materials returned to its 1989 level of 5 percent the same level after an increase to 8 percent over 1989-93, the shares of capital goods and automotive vehicles and parts expanded significantly. The former increased from 3 percent in 1989 to 6 and 9 percent in 1993 and 1998 respectively, whereas the latter fell from 28 percent to 25 and increased to 31 percent over the same period. In assessing the scale of these changes, note that the value of imports more than doubled between 1993 and 1998.

Table 2: Factor intensity of trade with the EU, 1993-98 (in million of US dollars and percent)

	1993	1994	1995	1996	1997	1998	Growth in 1998
	Exports to the EU (million of US dollars)						
Natural Resource Based	3,820	4,567	5,336	4,641	4,800	4,862	1.3
Unskilled Labor	2,967	3,473	4,496	4,657	4,460	5,115	14.7
Capital intensive	1,268	1,607	2,475	2,680	2,914	3,372	15.7
Skilled Labor	1,760	2,269	3,479	3,520	3,971	4,847	22.1
	Composition of Poland's exports to the EU (in percent)						Index 1998, 1997=100
Natural Resource Based	38.9	38.3	33.8	29.9	29.7	26.7	90
Unskilled Labor	30.2	29.1	28.5	30.0	27.6	28.1	102
Capital intensive	12.9	13.5	15.7	17.3	18.0	18.5	103
Skilled Labor	17.9	19.0	22.0	22.7	24.6	26.6	108
	Export Specialization Index (a)						
Natural Resource Based	1.36	1.37	1.24	1.10	1.13	1.15	
Unskilled Labor	2.22	2.24	2.34	2.44	2.22	2.27	
Capital intensive	0.38	0.39	0.44	0.48	0.49	0.48	
Skilled Labor	0.75	0.78	0.88	0.92	**1.02**	**1.05**	

Source: Own calculations from EU foreign trade data as reported to the UN COMTRADE database.
Note: (a) Export Specialization Index is calculated as a ratio of shares of Polish exports to the EU to the shares of the EU external imports.

The third notable feature concerns the shift in factor content of Poland's EU-oriented exports towards skilled labor intensive products (Table 2). Although Poland's exports of

unskilled labor intensive goods have been steadily increasing in both absolute and relative terms and constitute the most important group in Poland's exports, it can be argued that this shift towards skilled labor intensive products will continue thus closing the gap between Poland's endowment in human capital and the factor content of its exports. Consider that unit labor costs have continued to increase in Poland—by 2.9 percent in 1995, 12.6 percent in 1996, and 1.5 percent in 1997.[16] Consider also that only few Polish producers of unskilled labor intensive products (e.g., textiles) possess internationally recognized brand names. In consequence, one should not expect a further expansion of exports in this product group. As an example may serve the fact that outward processing trade in textile and apparel industry has been moving away from Poland towards its eastern neighbors where labor costs are lower.

The differential between wages of skilled workers in Poland and in western European countries, however, continues to remain high.[17] Thus, there exists a scope for increasing the exports of skilled labor and capital intensive products to the EU. Another look at Table 2 indicates that indeed the absolute value and the relative importance of these two types of products in Poland's exports increased significantly in the 1990s. The two categories accounted for 45 percent of Poland's exports to the EU.

The last part of Table 2 presents the specialization indices, defined as share of product category *i* in Poland exports relative to its share in EU external imports. The figures suggest that Poland's strong specialization in unskilled labor intensive products and its decreasing specialization in natural resource based goods, have been augmented by specialization in skilled labor intensive products which emerged in 1997.

Another prominent feature of Polish exports is a steady movement away from traditional stagnant markets. This is important because it makes a difference whether a country specializes in products for which import demand is growing or in products for which the import demand is either stagnant or contracting. The former, often referred to as sunrise sectors, offer greater space for expansion, whereas in the latter (sunset sectors) competitive pressures are on the increase. Similarly, prospects for expanding exports are better in sunrise than in sunset sectors.

To assess to which sectors Polish exporters tend to gravitate, we use the following criteria to define sunrise markets in the EU: (i) the value of EU external imports in terms of SITC four-digit product categories is at least US$10 million, (ii) the average growth rate of imports is above 5% over 1996-98, and (iii) EU imports increased every year in this period.

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[16] See EBRD 1998 (Table 3.7).

[17] The average wage in Poland was equal to US$320 per month in 1998 (EBRD 1998, p.66).

Polish 'sunrise' exports expanded rather vigorously over 1994 growing at an average rate of 21 percent over 1994-98. Their share increased from 20 percent in 1997 to 22 percent in 1998 (Table 3). Among 12 Polish top performers in EU sunrise markets one finds mostly manufactures with the exception of vegetables used in pharmacy (SITC. 2924) and temporarily preserved fruit (SITC. 0536). Capital intensive and skilled labor intensive products figure predominantly among to performers.

Table 3: Presence in EU sunrise markets in 1993-97

A: Poland's Top 12 Performers in EU Sunrise Markets				
	Average growth rate of EU external imports (in percent)	Value of Polish exports to the EU (mln US$)	Average growth rate of Polish exports to the EU (in percent)	Factor intensity
Commodity SITC 4-Digit Rev. 1	1996-98	1998	1996-98	
7241 Television Receivers	8.8	511.4	138.8	**SL**
8996 Orthopedic Aids	7.8	5.1	77.4	**SL**
7221 Electric Power Machinery	8.0	230.3	42.8	**CI**
2924 Veg Used in Pharmacy Etc	14.5	19.7	30.7	NR
6210 Materials of Rubber	6.0	32.9	29.8	**SL**
6299 Other Rubber Articles Nes	7.5	26.0	25.6	**SL**
8959 Other Office Supplies	11.3	3.0	23.4	UL
6642 Optical Glass Unworked Etc	23.7	1.9	18.0	UL
0536 Fruit Temporarily Preserved	6.6	232.4	15.0	NR
7198 Oth Machines Nonelectric	6.2	59.1	14.7	**CI**
8412 Textiles Clothing Accessories Nonknit	5.6	28.0	14.1	UL
7114 Aircraft Engines Inc Jet	20.1	8.4	7.6	**CI**

B: Value, share in EU-destined exports, and rate of growth, 1993-98						
	1993	1994	1995	1996	1997	1998
Value of Polish 'sunrise' exports (in million of US dollars)	1,584	1,854	2,552	2,961	3,257	3,975
Share in EU-destined exports (in percent)	16.1	15.5	16.1	19.1	20.2	21.8
Rate of growth of Polish 'sunrise' exports in %	14.1	17.0	37.6	16.0	10.0	22.0

Source: Own calculations from EU foreign trade data as reported to the UN COMTRADE database.
Notes: NR = Natural Resource based; UL= Unskilled Labor intensive; CI =Capital intensive; SL= Skilled labor intensive.

At the top of the list in terms of value and rate of growth are television receivers (SITC. 7241). One should also note the presence of electric power machinery (SITC. 7221) ranked third in terms of growth and value of exports. As discussed below, these are the sectors in which MNCs, such as Thomson and ABB, and international production networks associated with them play an important role.

In fact, foreign owned firms have been responsible for the identified above four features of Poland's trade patterns during transition. We shall now turn to a detailed discussion that provides empirical supports to this observation.

V. Foreign Firms and External Trade

Foreign owned firms have shaped the dynamics of Poland's trade on both export and import side. Aggregate statistics in Table 4 reflect the growing importance of firms with foreign participation in Poland's international trade. In 1994, such firms accounted for 21 percent of Poland's total exports. This figure increased to 38 percent in 1996 and 48 percent in 1998. Thus, these firms are now responsible for almost half of Polish exports. Between 1994 and 1998 the value of their exports increased more than three-times from US$3.6 billion to US$13.5 billion. Considering that FDI significantly increased over 1997-99, the share of foreign owned firms in total exports is likely to expand. On the import side, this share was larger than that of exports in each year over 1994-98, although it recorded lower growth rates. Foreign owned firms account now for over half of Polish total imports.

Table 4: Exports and imports of foreign owned and locally owned firms, 1994-98 (in million of US dollars)

	1994	1995	1996	1997	1998
Foreign owned firms – exports	3,609	7,770	9,267	11,047	13,528
Locally owned firms –exports	13,577	15,084	15,120	14,644	14,661
Foreign owned firms – imports	7,101	10,758	15,674	21,120	25,122
Locally owned firms - imports	14,331	18,260	21,418	21,133	21,878
Foreign owned firms – share in total exports	21	34	38	43	48
Locally owned firms – share in total imports	33	37	42	50	53
Ratio of exports to imports	**1994**	**1995**	**1996**	**1997**	**1998**
Foreign owned firms	50.8	72.2	59.1	52.3	53.8
Locally owned firms	94.7	82.6	70.6	69.3	67.0
All firms	*80.2*	*78.8*	*65.7*	*60.8*	*60.0*

Source: Foreign Trade Research Institute (various years, Table 3.1) and own calculations.

For this reason, many observers accuse foreign owned firms of having an adverse effect on the balance of trade because of their allegedly excessive imports. Indeed, exports by foreign firm were lower than their imports in 1994-98. And so were exports by domestically owned firms. But domestically owned firms paid for a larger share of their imports through their own export earnings. However, the ratio of export earnings to imports was consistently falling from 95 percent in 1994 to 67 percent in 1998. While the value of this ratio for foreign firms was lower and volatile, the difference between the two declined substantially over 1994-98. Nonetheless, the difference remains high and indeed foreign owned firms made a significantly larger contribution to the growing gap between exports and imports.

The relevance of this finding is not only limited but also misleading. Consider the following. First, as was observed earlier, pent-up consumer demand attracted many foreign investors during the initial stages of transition. These were mainly import substituting

investments. The increased imports of inputs were probably offset by lower imports of final products. Hence, their impact on trade balance was probably positive. Furthermore, provided that tariff jumping was not the sole rationale behind these investments, their products are competitive not only in domestic but also in international markets. Consider that industrial imports originating in Poland's preferential partners (EU, EFTA and CEFTA) have largely unimpeded (i.e., duty-free) access to the domestic market. Products produced domestically thus face fierce competition. Combined with international marketing skills and resources, foreign owned firms could easily switch to foreign markets, if domestic circumstances warrant it. Thus, whatever their initial motivations in setting up production might be they may easily operate in other markets.

Second, sudden surge in FDI inflows usually results in spike of capital equipment imports. Foreign owned firms contributed to the increase of these imports over 1993-98. They purchased abroad US$3,944 million worth of capital goods in 1998, which constituted a 20 percent increase from US$3,274 million of capital goods imported in 1997 and a 263 percent increase from US$1,086 million in 1994.[18] Note that from the point of view of the balance-of-payments situation, this deterioration in the current account position is offset by inflows into the capital account.

Third, with the entry of foreign firms in retail trade, imports formerly regarded as domestic have become attributable to foreign firms.

Last but not least, the propensity to import does not depend on ownership but on availability of locally produced inputs and consumer products. If these are domestically available at internationally competitive prices, a firm, no matter whether locally or foreign owned, will refrain from more expensive imports. It takes time to find local cost-effective suppliers and thus establish backward and forward linkages. The rule of thumb says that it usually takes around 2-3 years to develop local sourcing capacity. While a firm operating in a global network's supply chains is usually 'condemned' to export as long as the next point downstream is not shifted to Poland, domestic demand conditions shape export behavior of other foreign firms. Hence, the crux of the matter is that efficiently run firms will display similar behavior in terms of their decision to import since if a firm relies on more expensive domestic inputs, its capacity to compete in international and domestic markets will be hampered.

On the other hand, however, the ability of the firm to export is likely to increase with foreign ownership even without any changes in technology or organization of a firm. This happens especially when foreign ownership offers access to marketing and production channels

[18] Own calculations based on figures from Foreign Trade Research Institute (various years, Table 3.1).

of a parent company (see Section VI). Since establishing presence in foreign markets requires not only marketing skills but also considerable resources, foreign ownership increases prospects for exports. In addition, the change of ownership may be a necessary condition for a firm to become a supplier in a global production and marketing network.

Hence, it should come as no surprise that foreign owned firms tend to be more export-oriented than domestic ones and are therefore bound to make a relatively larger contribution to reintegration of Poland into the world economy. Without tracing export behavior of the same set of foreign and locally owned firms over time, it is impossible to make any generalizations. But even if a foreign owner acquires a domestic firm, which was highly export-oriented, this usually does not impede its capacity to export. To the contrary, it usually makes it even more competitive in both domestic and external markets.

The comparison of export orientation of Polish and foreign owned firms provides strong empirical support for this conclusion. The percentage of income of foreign owned firms derived from exports fell between 1995-97 (from 15.3% to 13.9% and 13.8%) and increased in 1998 (14.1%). The corresponding figure for all firms operating in Poland declined each year over 1995-98 from 10.4 percent to 9 percent. But the export intensity (measured in terms of the share of exports in total income) of foreign firms to export intensity of all firms was 1.47 in 1995, fell to 1.42 in 1996 and then grew rather significantly to 1.48 in 1997 and 1.57 in 1998.[19]

Another indication of export orientation of foreign owned companies is that they have already firmly established themselves among the largest firms and the largest exporters in Poland. Among the 500 largest enterprises in Poland there were 144 firms with foreign capital (or 29 percent of the total) accounting for 46 percent of exports of the group in 1999. The average export revenue earned by a firm with foreign capital was equal to US$224 million, as compared to US$97 million for a locally owned company. On average, a firm with foreign capital increased its export earnings by 14 percent between 1998 and 1999, while for domestic firms the corresponding figure was only 2 percent. Moreover, firms with foreign capital were on average more export oriented shipping abroad 27.5 percent of their output as compared with 17 percent for locally owned firms.[20]

A similar picture of the growing presence of foreign firms among the largest exporters emerges from the examination of Poland's top 100 exporters.[21] The number of foreign owned

[19] Own calculations based on figures from Main Statistical Office (various years).

[20] Own calculations based on "Lista 500 najwiekszych przedsiebiorstw" (Top 500 enterprises), *Gazeta Bankowa*, April 2000.

[21] Own calculations based on the "List of Poland's Top 100 Exporters in 1999" compiled by BOSS.

firms among top 100 grew from 33 in 1997 to 43 in 1998. Again, the export orientation of foreign firms among top 100 as measured by the share of exports in their total sales (62% in 1998) was significantly larger than that of locally owned firms (49%).

Foreign owned firms have also contributed to the increased concentration of Polish exports as measured by the share of largest exporters in Poland's total exports. The share of Poland's top 100 exporters in total exports increased from 35 percent in 1996 to 39 percent in 1998. The share of foreign owned firms in the total exports of the group was 40 percent in 1998. However, if exporters of such primary commodities as coal, sulfur and copper are excluded, this figure jumps up to 57 percent.

Foreign owned firms have largely influenced or even triggered positive change in factor intensities of Polish exports towards skilled labor intensive and capital intensive products. A review of Poland's 10 largest capital intensive and 10 largest skilled labor intensive products exported to the EU also provides links to the activities of foreign firms (see Appendix Table 1). For instance, FIAT Poland seems to have contributed to the ten-fold increase in the value of exports of motor vehicles between 1990 and 1998, Phillips to the sales of electric lamps, Thomson to exports of television sets, just to name a few.

Last but not least, foreign firms have made a large contribution to the integration of the Polish economy into international markets. Two features stand out—their ability to compete in multiple markets contributing to geographical diversity and their presence in expanding rather than contracting markets in the EU. Although foreign firms tend to concentrate mostly on EU markets, they have already displayed flexibility in terms of geographical orientation of their trade. The share of EU markets in exports of foreign owned firms fell from 78 percent in 1995 to 75 percent in 1996 and 71 percent in 1997 and increased to 75 percent in 1998 (Appendix Table 2).

There are, however, clear signs that foreign owned firms contribute to the increase in geographical diversification of Polish exports and Poland's integration into the economies of other EU-candidates. For instance, in 1995 the share of foreign owned firms in CEFTA-oriented exports was 19 percent as compared with their share of 34 percent in Poland's total exports. In 1998 the corresponding shares were 45 percent and 48 percent. The share of these markets in exports of foreign owned firms rose from 3 percent in 1995 to 7 percent in 1998. The corresponding figures for imports were 4 and 6 percent. It appears that integration within various production and marketing networks explains some portion of this trade. For instance, Daewoo accounts for some trade in automotive parts between Poland and Romania and Volkswagen for this trade with the Czech Republic. The paradox is that MNCs may succeed where CMEA failed, i.e., in integrating these economies.

Two other developments that have contributed to the fall in Poland's geographical concentration of trade are noteworthy. First, the share of Germany in exports of foreign owned firms declined from 43 percent of their total exports in 1995 to 36 percent in 1997 and increased to 38 percent in 1998. Second, there are indications that Poland has become a regional hub for some foreign owned firms. Although the share of Russia fell in the crisis year of 1998, it merely contracted to its 1995 level (4%). The share of Ukraine doubled in 1996 and remained flat at about 2 percent.

Poland's export potential and competitiveness are likely to be enhanced by the recent increase in FDI in service sectors. While services do not increase exports of goods, they indirectly affect trade by lowering transaction costs and attracting foreign investors in manufacturing. Note that foreign companies accounted for 62 percent of total investment outlays in wholesale and retail trade in Poland and for 59 percent in the financial sector in 1997.[22] With the progressive opening of the banking sector, the importance of FDI in this sector has considerably increased.

The improvement in the quality of services together with the progress in structural reforms increasing contestability of domestic markets to producers and investors alike has also a profound impact on the expansion in intra-product trade based on fragmentation of production.

VI. Participation in EU-based production and distribution networks

Trade in industrial parts is the most rapidly growing component of global trade increasing faster over the last decade than trade in finished manufactures. According to a very conservative estimate, global trade in parts and components, amounting to around US$800 billion annually, accounts for around 30 percent of world trade in manufactures (Yeats 1998). This internationalization of production has been taking place within industries such as automobiles, television and radio receivers, sewing machines, office equipment, electrical machinery, power and machine tools, typewriters, cameras and watches (USITC 1996).

The collapse of central planning removed systemic barriers to integration ofCEECs firms into international markets. Until then, CEECs remained outside the reach of the globalization process based on production fragmentation or sharing. One would expect that with the transition to competitive markets locally and opening to the world, CEECs stand a good chance of taking advantage of a 'global disintegration' of production.

Incorporation of local producers into production and marketing networks can extend significant benefits both to the country involved, such as Poland, and to MNCs. For the latter, this

[22] All data from Foreign Trade Research Institute (1999, p. 38).

offers a wider menu of choices in their strategies to expand the position in global markets, as they may become more competitive thanks to lower costs of moving some production fragments to CEECs. For the former, it yields several advantages: it is usually accompanied by transfer of technology and managerial know how with potentially significant demonstration effects. It gives firms located in Poland direct access to larger markets that allow exploiting economies of scale. It boosts exports without firms incurring marketing costs and provides greater stability in earnings thanks to a global reach of a "parent" company. The expansion in network-driven trade contributes to boosting productivity and integrates the national economy into global markets.

Participation in marketing and production networks may entail two different forms of export behavior related to the position assigned to a firm in division of labor. The first form consists of the production by a foreign owned firm of finished products that the parent company distributes in regional or world markets. This is the case of the so-called horizontal FDI. The second form involves the participation of a foreign owned firm located in Poland in a supply chain of the parent company. In the theoretical literature, this is usually called vertical FDI.[23] Without access to firms' usually confidential data, it is very difficult to assess the scope of trade associated with the first form, i.e., supplies of finished products to the parent company. As for the second form, one may suspect that foreign owned firms account for most, if not all, of trade associated with the networks discussed below.

Signs abound that Polish producers are becoming part of this rapidly emerging global division of labor based on production fragmentation. Like highly developed countries, Poland has also experienced a faster growth in trade of parts and components than in trade of manufactures. Total exports of parts and components grew at an average rate of 33 percent per annum over 1995-98 and their share in total exports of manufactures increased from 7 to 10 percent over this period. Imports grew even faster at 37 percent per year and their share in total imports increased from 9 to 12 percent. EU has shaped the dynamics of this trade: its share in Poland's trade turnover rose from around 55 percent in 1993 to 75 percent in 1998.

To fully capture this trade, we identify parts, components and final products in three networks usually organized around MNCs—automotive network, telecommunication equipment jointly analyzed with office equipment and automatic data processing machines (hereafter

[23] Strictly speaking, the theoretical literature uses the term horizontal MNCs to describe multi-plant firms that replicate roughly the same activities in many locations. Models of horizontal FDI have been developed by Markusen (1984), Horstmann and Markusen (1987, 1992) and Markusen and Venables (1997, 1998). Vertical MNCs, on the other hand, are defined as firms that geographically fragment the production process into stages, typically on the basis of factor intensities. The literature on vertical MNCs includes Helpman (1984) and Helpman and Krugman (1985).

'information revolution' network) and furniture network.[24] Except for the furniture network as a rule dominated by unskilled labor intensive products, parts and components as well as final products of the other networks are technology and skilled labor intensive.

Table 5: Trade within production and marketing networks, 1993, 1997 and 1998 (in millions of US dollars)

	Information Revolution			Automotive		
	1993	1997	1998	1993	1997	1998
Final products exports	11	323	562	536	1,074	1,219
Exports of parts and components	78	292	294	74	380	489
Imports of parts and components	256	675	784	355	1,794	1,506
Final products imports	260	750	954	1,014	1,899	1,836
Final exports minus parts and components imports	-245	-352	-222	182	-720	-287
Memo: share of final products, components and parts in trade with the EU						
In manufactured exports (in percent)	1.3	5	5.9	9.2	11.7	11.8
In manufactured imports (in percent)	5	5.8	6.5	13.2	15.1	12.5
	Furniture			**TOTAL**		
	1993	1997	1998	1993	1997	1998
Final products exports	519	1072	1,223	1,066	2,469	3,004
Exports of parts and components	77	226	287	229	898	1,070
Imports of parts and components	35	94	126	646	2,563	2,416
Final products imports	85	155	187	1,359	2,804	2,977
Final exports minus parts and components imports	484	978	1,097	421	-94	588
Memo: share of final products, components and parts in trade with the EU						
In manufactured exports (in percent)	9	10.5	10.5	19.5	27.1	28.2
In manufactured imports (in percent)	1.2	1	1.2	19.3	22	20.2

Source: Kaminski and Ng (2001).

These networks have played a growing role in Poland's trade with the EU. The share of these networks in Poland's exports of manufactures to the EU rose from 20 percent in 1993 to 27 percent in 1997 and 28 percent in 1998 (Table 5). The corresponding figures for imports were 19 percent in 1993, 22 and 20 percent in 1997 and 1998, respectively. The value of aggregate exports of final products, components and parts of these networks increased almost three-fold over 1993-97 and by 21 percent in 1998, while the value of imports grew three-fold and 0.5 percent in the same period.

The furniture network is included in the study because large retailers in the EU shape both production and trade in this sector. In contrast to car manufacturing, which usually involves either foreign greenfield investment or equity investment, participation in furniture networks derives mainly from outsourcing, albeit not exclusively. This network has been traditionally the largest foreign currency earner in Poland. It brought US$1 billion in 1997 and US$1.2 billion in

[24] For a list of product categories falling into each network, see Kaminski and Ng (2000).

1998 with exports of parts and components accounting for a larger share of the surplus. Its share in total network exports of parts and components rose from 42 percent in 1997 to 46 percent in 1998.

The information revolution network embodies hardware of the current information revolution. The parts and components of the 'information technology' networks have driven foreign trade of highly developed countries with exports of office machinery displaying the fastest annual growth of 15.9 percent over 1978-95, followed by telecommunications growing at 11.5 percent over this period (Yeats 1998).

In Poland telecommunications and recording equipment has almost exclusively driven the trade dynamics of this network especially on the export side. The shares of the other "sub-network"—office equipment and automatic data processing machines—in trade of the information revolution network were 1.2 percent in exports of final products in 1998, 6.1 percent in exports of parts and components, 24.4 percent in imports of components and parts, and 6.6 percent of imports of final products.

The information revolution network has displayed the largest growth in network-related Poland's trade with the EU not only over 1993-97 but also in 1998. The value of exports of final products increased 29-times over 1993-97 and 74 percent in 1998 alone, albeit from a low base, and the share of all products of this network in networks total exports increased from 7 percent in 1993 to 18 percent in 1997 and to 21 percent in 1998. The value of imports in 1998 increased 22 percent and their share rose from 27 to 32 percent indicating ongoing modernization of the Polish economy. Furthermore, the contraction in the difference between final exports and imports of parts and components from US$720 million in 1997 to US$287 million in 1998 suggests a growing share of domestic suppliers within this network (Table 5).

As for the automotive sector, globalization based on production fragmentation has been the major driving force behind transformation of auto industry worldwide in the 1990s. It has also deeply affected the ways in which this sector has changed in Poland, albeit the foreign trade policy vis-à-vis this sector seems to have distorted its evolution. In contrast to other Central European countries participating in this network (i.e., Czech Republic, Hungary, Slovakia and Slovenia), the value of exports of final products in the automotive network has been below the value of imports of parts and components. Poland relied mostly on assembling motor vehicles as well as piston engines from imported parts for domestic consumption rather than for shipments within the network. This was due to high tariffs and other subsidies provided to investors in this sector during the initial stages of transition.

By 1998, however, some negative impacts of initially high tariffs and subsidies began to retreat. Exports of parts and components grew 29 percent and their share in networks exports increased from 42 percent in 1997 to 46 percent in 1998. Aggregate exports rose 18 percent whereas imports contracted by 10 percent. Thus it appears that distortions induced by a high effective rate of protection of final products have been alleviated by the increase of domestic production of parts and components.

To assess the scope of MNCs present in Poland in network exports we look at the data on the weight of sectors in exports generated by foreign firms (Table 6). Note that two sectors—electrical machinery and appliances and transport equipment—accounting together in 1998 for 40 percent of exports by foreign firms largely fall within networks. As can be seen from data in Table 6, the share of foreign owned firms in exports of electrical equipment and transport equipment amounted in 1998 to 65 percent and 70 percent respectively.

Exports of transport equipment as a rule take place within automotive networks organized around large MNCs. While some firms involved in information revolution network are in the sector of electrical equipment, machinery and appliances (e.g., television sets and tubes), it would be difficult to separate them. Total exports of electrical machinery alone rose 31 percent in 1998 and the value of export specialization index exceeded unity. It seems that this impressive improvement can be attributed to the incorporation of local producers in a global system of production and marketing. According to a very conservative estimate, their share in EU-oriented exports of manufactures increased from around 20 percent in 1993 to 30 percent in 1998. The share of foreign firms of 43 percent is also high (and growing) in miscellaneous manufactured articles, which includes among others furniture.

However, like in the case of electrical machinery and transport equipment, it is impossible to directly attribute export activity to foreign owned firms. Some insights can be gained from the discussion of specific examples of how the presence of MNCs contributes to Poland's participation in global production and distribution networks. The first example presents a case study of Delphi Automotive Systems, which is relevant to the automotive network. Another example focuses on investment projects undertaken by Thomson and relates directly to the information revolution network. The last example relates to the case of ABB.

Table 6: Exports of foreign owned firms by sector, 1996-98 (in million of US dollars and percent)

	Exports of foreign owned firms (in million of US dollars)	Share in total Poland's exports (in percent)	Share in total exports of foreign owned firms (in percent)

	1997	1998	1997	1998	1997	1998
Total	**11,077**	**13,528**	**43.0**	**47.9**	**100.0**	**100.0**
Machinery and appliances; electrical equipment	2,332	2,995	63.5	64.7	21.0	22.1
Transport equipment	1,341	2,436	68.7	69.8	12.1	18.0
Textiles and textile articles	1,348	1,498	46.8	47.6	12.2	11.1
Base metals and articles thereof	1,376	1,453	35.9	39.8	12.4	10.7
Misc. manufactured articles - furniture, prefabricated buildings, toys	829	972	39.8	43.3	7.5	7.2
Prepared foodstuffs	882	738	50.6	52.2	8.0	5.5
Plastics and articles thereof; rubber and articles thereof	481	578	51.2	55.0	4.3	4.3
Pulp of wood, paper and paperboard and articles thereof	510	568	72.2	73.7	4.6	4.2
Products of the chemical industry	407	459	22.8	28.0	3.7	3.4
Live animals and animal products	336	380	39.4	42.8	3.0	2.8
Wood and articles of wood	307	377	31.3	34.6	2.8	2.8
Vegetable products	208	283	32.2	36.9	1.9	2.1
Articles of stone; ceramic products; glass	197	246	36.2	40.3	1.8	1.8
Mineral products	226	193	11.3	11.0	2.0	1.4
Raw hides and skins, leather and articles thereof	94	115	43.3	45.0	0.8	0.9
Footwear, headgear and the like	94	109	30.3	37.1	0.8	0.8
Optical, photographic, measuring, checking instruments and apparatus	66	82	43.5	47.5	0.6	0.6
Fats and oils	36	39	63.7	69.6	0.3	0.3
Pearls; precious stones; precious metals and articles thereof	7	6	3.5	2.3	0.1	0.0
Works of art, collectors' pieces and antiques	1	2	0.6	10.5	0.0	0.0
Arms and ammunition	0	0	1.9	7.4	0.0	0.0

Source: Foreign Trade Research Institute (1998 and 1999, Table 3.3) and own calculations.

Delphi Automotive Systems

In 1988 General Motors (GM) began the process of creating within its structures a separate entity focused exclusively on producing automotive parts and components. As a result of this process, Delphi Automotive Systems was established in December 1998. Initially, 100 percent of its shares were owned by GM but subsequently all the shares were distributed among GM stockholders. In 1999, Delphi Automotive Systems was active in 37 countries. It employed 213.5 thousand people and its total sales exceeded US$29 billion. It consisted of 175 production plants, 51 customer service centers, 41 joint ventures and 28 R&D facilities.

Delphi entered Poland in 1994, and it currently owns there five production plants, one R&D facility, a customer service center, and an administrative and financial center. Its total employment in Poland is over 4,500 people. The total value of Delphi investment reached US$150 million. This places the company among top 50 investors in Poland. About two thirds of automotive parts and components produced by Delphi are sold in Poland, while the remaining

share is exported to Germany, Italy, Turkey, France, UK, Sweden and Russia. Parts and components produced in Poland are sold to Daewoo, DaimlerChrysler. Isuzu, Rover, GM, Ford, Volkswagen, Volvo, Fiat, and Renault. The company is planning on increasing its production as well as the share exported in the near future.

Delphi plants in Poland have earned numerous ISO 9000, 9001 and 14001 quality certifications. In May 2000, Delphi opened an R&D center in Krakow where it currently employs 51 engineers but plans to expand its staff to 350 in 2005.

Thomson

In 1991, Thomson bought 51% of a Polish TV tube and component manufacturer Polkolor located in Piaseczno near Warsaw. Later on, Thomson also purchased a Polish TV producer in Zyrardow. In 2000, Piaseczno produced 4.6 million TV tubes, 3.1 million of which were exported. Piaseczno tubes may be found in Panasonic, Philips and Matsushita TV sets. In Poland, the Zyrardow plant and Daewoo also manufacture TV sets with Piaseczno tubes. The Piaseczno plant received ISO 9000 as well as ISO 14000 certificates. In 1994, it earned Thomson Corporate Quality Trophy, which is awarded to a factory that achieved the highest quality standard within the Thomson Corporation.

ABB

ABB was formed in 1988 of two electrical engineering companies: Swedish ASEA and Swiss Brown Boveri. Today ABB is present in 140 countries where it employs 164 thousand people and its revenues amount to US$24 billion. Both ASEA and Brown Boveri were present in Poland in the 1920s and 1930s. However, after World War II they had to limit their activities there to licensing. One of the success stories during that period was a licensing contract with Zamech, a company located in Elblag. ABB became a majority shareholder of Zamech shortly after Poland's political and economic transition had begun. Also in 1990, a Wroclaw company Domel joined the ABB group. Today, 16 companies located in Poland belong to the ABB family. In 1999, they employed 4,423 people and their revenues amounted to $383 million.

The ABB group follows the pattern of international division of labor. Namely, each company within the group produces final goods that are sold all over the world through the ABB distribution networks. And thus for instance, a Polish member of the group, ABB Elpar is the worldwide supplier of high voltage switchgear.

About twenty percent of products manufactured by ABB in Poland are exported, mainly to the EU but also to places located as far as New Zealand and Australia. ABB imports about

twenty percent of its inputs. The growing area of activity include exports of services and R&D. Recently, ABB has opened an R&D center in Krakow.

ABB Elta is the first company in Poland to possess a certificate of integrated quality and environmental management system complying with ISO 9001 and 14001, for the whole scope of activities. ABB has required ISO 9000 certificates from its local suppliers and in the future it may also require environmental management certifications.

VII. Conclusions

Technological developments in recent decades have led to an increasing importance of international division of labor and creation of global production and distribution networks.MNCs have been a major force driving these developments. Integration into the production and marketing arrangements of the multinational corporations may offer many benefits to transition economies, which after a long period of isolation liberalized their trade and investment regimes.

This paper studies the growing importance of global production networks and the role of MNCs in integrating a host country into the international division of labor in the context of Poland. It provides evidence of Poland's increasing participation in global production and distribution networks that is taking place through FDI inflows. It concludes that thanks to a large volume of FDI inflows expected in the near future, Poland's exports driven by production fragmentation will continue to expand at even faster rates than those observed in recent years.

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Appendix Table 1: Top 10 Products in EU-oriented exports of capital intensive products and skilled labor intensive products, 1990, 1996-98

Factor Intensity Product Group	1990	1996	1997	1998
Capital intensive: (CI)				
7231 Insulated Wire, Cable	117	267	236	358
7221 Electric Power Machinery	43	121	186	230
7293 Transistors, Valves, etc.	5	157	167	194
7222 Switchgear, etc.	21	117	175	176
7292 Electric Lamps, Bulbs	16	126	140	163
7199 Machine Parts, Accessories Nes	30	110	118	142
7291 Batteries, Accumulators	2	34	87	136
7249 Telecomm Equipment Nes	17	94	130	125
7193 Mechanical Handling Equipment	20	92	108	123
5619 Fertilizers Nes	38	88	102	117
Total Above Top 10 Capital intensive Products	310	1205	1449	1764
% of all Capital intensive products	24.0	45.0	49.7	52.3
Skilled Labor: (SL)				
7321 Pass Motor Veh Exc Buses	80	771	694	859
7241 Television Receivers	7	95	297	511
7328 Motor Vehicle Parts Nes	23	162	255	349
7323 Lorries, Trucks	3	186	313	304
6989 Other Base Metal Manufactures	55	190	201	258
6911 Structures, Parts Iron, Steel	63	297	255	255
6734 Iron, Steel Big Sections Etc.	103	104	123	169
6291 Rubber Tires, Tubes	29	130	136	169
7250 Domestic Electric Equipment	45	89	101	125
6415 Paper Etc In Bulk Nes	26	61	90	99
Total Above Top 10 Skilled Labor intensive Products	434	2085	2465	3099
% of all Skilled Labor intensive Products	42.8	59.2	62.1	63.9

Appendix Table 2: Direction exports of foreign owned firms and their shares in Poland's total exports, 1995-98

	Value of exports of foreign owned firms (in millions of US dollars)			Share of total exports of foreign owned firms (in percent)			Share of Poland's total exports accounted for by foreign owned firms (in percent)		
	1995	1997	1998	1995	1997	1998	1995	1997	1998
Total	7,876	11,077	13,528	100	100	100	34	43	48
EU	6,130	7,912	10,094	78	71	75	38	48	52
Other	748	1,038	1,167	9	9	9	28	39	45
FSU	613	1,262	1,165	8	11	9	24	28	30
CEFTA	232	688	913	3	6	7	19	40	45
EFTA	154	177	189	2	2	1	43	45	40
Germany	3,380	3,967	5,155	43	36	38	39	47	50
Italy	705	1,116	1,249	9	10	9	63	74	75
France	272	534	728	3	5	5	33	47	55
Netherlands	502	531	683	6	5	5	39	44	51
UK	271	460	596	3	4	4	30	48	54
Russia	354	691	527	4	6	4	28	32	33
Czech Rep	139	335	454	2	3	3	20	37	44
Belgium	160	266	363	2	2	3	29	48	52
USA	161	292	341	2	3	3	26	44	45
Sweden	234	260	331	3	2	2	40	43	49
Denmark	202	245	298	3	2	2	29	32	33
Austria	183	198	228	2	2	2	37	41	41
Ukraine	117	202	223	1	2	2	16	17	21

Source: Foreign Trade Research Institute (various years), *Foreign Investments in Poland*, Warsaw, Table 3.2 and own calculations.

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